Quotation

To:	Tom Peat, Ph.D.	Quote # 0109141
	Structural GenomiX	
	10505 Roselle Street	
	San Diego, CA 92121	
Phone:	(858) 558-4850 x110	
Fax:	(858) 558-4859	
Email:	tom@stromix.com	
Quote Date:	09/14/01	
Terms:	Due on receipt,	
Rates:	Labor (Engineering) - $120/hr	
	Materials + 30%(overhead)	
	Travel Expenses – Cost	
	Mileage - $0.345/mile	
Quote Exp.:	10/15/2001	
Lead-time:		
Billing	At the end of each month and project completion	
Shipping:	FOB RoboDesign in Carlsbad, CA	

The following is a time and material quote to have RoboDesign continue development of the automatic protein crystal image classification.

Funding is requested for PHASE IIIA.

Upon Successful completion of PHASE IIIA, funding will be sought for PHASE IIIB
The enclosed items will be phase III of the project.

Phase IIIA classifies the drops into 10 categories as shown immediately below:

SCORE	DESCRIPTION
0	clear
1	light precipitation
2	heavy precipitation
3	ugly precipitation
4	phase separation
5	unknown
6	Spherolites
7	Grainy precipitation
8	Microcrystals
9	Crystal

Enclosure 9

Phase IIIB extends the automatic scoring and classification for the CLASS 9 crystal into 10 additional classes as shown immediately below:

SCORE	DESCRIPTION
9.0	crystal (no comments)
9.1	needles, intergrown
9.2	needles, single
9.3	plates, intergrown
9.4	plates, single
9.5	chunks, < 50microns, intergrown
9.6	chunks, < 50 microns, single
9.7	chunks, > 50 microns, intergrown

The estimated costs for Phase IIIA and Phase IIIB are given below:

Item	Description	Cost Each	Ext. Cost
	Phase III Classify Drops algorithm Development		
1	*PHASE IIIA Classify Drops category 0-9*	$88,800.00	
	Estimated Engineering labor of 740 hours @ $120/hour		
2	*PHASE IIIA Related Software Cleanup tasks*		
	Estimated Engineering labor of 232 hours @ S120/hour	$27,840.00	
	SubTotal PHASE IIIA		$116,640.00
3	*PHASE IIIB Classify CLASS 9 Crystals into 9.0 -9.9*		
	Estimated Engineering labor of 880 hours @ $120/hour	$105,600.00	
	SubTotal PHASE IIIB		$105,600.00
	total PHASE IIIA & PHASE IIIB		**$222,240.00**

Quotation Approval: _____   Date:___/___/_____

Quote 0109141 SGX   2

September, 14, 2001

Tom Peat, Ph.D.
Structural Genomix
10505 Roselle Street
San Diego, CA 92121

Dear Tom,

I am pleased to submit the attached quote to continue development of the Crystal drop
Automatic classification software development as Phase IIIA f the vision system.

At this time, only funding for PHASE IIIA is sought. Phase IIIA gives SGX scoring of
drops in the 0-9 categories.

PHASE IIIB funding is sought only after successful completion of the PHASE IIIA and
will extend the scoring of crystal 9.0 class into 9.0 through 9.9

Please review the enclosed task list for the details.

If you have any questions, please do not hesitate to contact me.

Best Regards,

Mandle Mickley
Principle Engineer

Cc: Brian Ganz, David Jewell, Andy Moulds, John Adams

Phase III drop classification algorithms

1. Phase IIIA Classify drops Algorithm Development – Class 0-9

SCORE	DESCRIPTION
0	clear
1	light precipitation
2	heavy precipitation
3	ugly precipitation
4	phase separation
5	unknown
6	Spherolites
7	Grainy precipitation
8	Microcrystals
9	Crystal

Refine Prototype scoring algorithm (class 0-9)
RoboDesign will work together with SGX to refine the prototype scoring algorithm that has been successful on a very limited testing. This will be an iterative process to ensure that this is a powerful and useful tool for the crystallographers.

Define and Code data tag for dual automatic-machine/ manual-crystallographer scoring
Allows recording and storing of dual scoring methods, whereas the machine scores automatically and the crystallographer scores manually. This feature is needed to proof the automatic scoring.

Code, release, and install prototype phase III at SGX
The improved prototype algorithm and data tags will be installed on the systems at SGX. The autoscoring will initially be "in-the-background" while traditional manual scoring will continue..

Collect machine score vs operator score vs the actual image
This is the data needed to evaluate how well the automatic scoring is working

Generate Test Results
>   Analyze the test data, look for the trending, and propose additional fixes to the algorithm

Second release of Phase III – class 0-9
>   Release and install improved and hopefully final version for classifying 0-9

Retest and evaluate and publish results
>   Analyze the test data, and verify and satisfactory operation

2. Phase IIIA related software cleanup tasks

Auto-calibration for Image Acquisition
>   Lighting, dimensional, gain, contrast will self calibrate to help provide a higher level of consistent answers across the vision systems in the automatic scoring operation.

Sitting Drop micro-well plate
>   Add in software to allow analysis of this new plate type

1536 micro-well plate with crystals in oil
>   Allow analysis of small crystals in oil in 1536 micro-well plate.

Improved Auto-focus
>   Auto-focus parameters need adjusting and a few modifications to the algorithm are needed to increase performance.

Misc. Cleanup and bug fix
>   There are a few minor items that require cleanup

3. Phase IIIB Further Classify Crystals of Class 9 into 9.0 – 9.9 as below:

SCORE	DESCRIPTION
9.0	crystal (no comments)
9.1	needles, intergrown
9.2	needles, single
9.3	plates, intergrown
9.4	plates, single
9.5	chunks, < 50microns, intergrown
9.6	chunks, < 50 microns, single
9.7	chunks, > 50 microns, intergrown

Investigate algorithmic approach

To further categorize the class 9 crystals into Classes 9.0 through 9.9 will require a fairly high level of research and development. The output of this stage is an algorithm.

Generate prototype algorithm code

The prototype algorithm will be coded in a form that allows further testing of the method.

Test prototype on limited test set

Determine the quality of the algorithm on a limited test set.

Refine prototype algorithm (scoring 9.0 – 9.9)

Based on the limited test, refine and code the improvements to the algorithm.

Code, release, and install prototype scoring 9.0-9.9 algorithm at SGX

Ready the system for improved classification algorithm, install and test installation.

Collect machine score vs operator score vs the actual image

This is the data needed to evaluate how well the Class 9.0 – 9.9 automatic scoring is working

Generate Test Results

Aanalyze the test data, look for the trending, and propose additional fixes to the class 9.0 – 9.9 algorithm

Second release of Phase III – class 9.0 – 9.9 additions

Release and install improved and hopefully final version for classifying 9.0 – 9.9

Retest and evaluate and publish results

Analyze the test data, and verify and satisfactory operation